REMARKS/ARGUMENTS

As a result of this Amendment, claims 1-11 are under active consideration in the subject patent application.

In the Official Action, the Examiner has:

(1) rejected claims 1-3, 5-7 and 9-11 under 35 U.S.C. 103(a) in view of the Examiner's proposed combination of U.S. Pat. No. 5,412,535, issued to Chao et al. (the "Chao reference"), and U.S. Pat. No. 4,274,479, issued to Eastman the "Eastman reference");

(2) rejected claims 4 and 8 under 35 U.S.C. 103(a) in view of a proposed combination of the Chao and Eastman references, with U.S. Pat. No. 6,536,510, issued to Khrustalev et al.(the "Khrustalev reference"); and

(3) identified prior art made of record and not relied upon but considered pertinent to Applicant's disclosure.

With regard to Item 1, Applicants traverse the Examiner's rejection of claims 1-3, 5-7 and 9-11 under 35 U.S.C. §103. Reconsideration and withdrawal of the rejection under 35 U.S.C. §103 are requested for the following reasons.

Applicants provide a heat pipe including a grooved sintered wick that comprises a plurality of individual particles which together yield an average particle diameter. At least two lands are arranged in fluid communication with one another through a particle layer disposed between them where the particle layer comprises at least one dimension that is no more than about six average

particle diameters. No such structure is taught or suggested by Chao, Eastman, or Khrustalev.

More particularly, Chao discloses a heat pipe 20 mounted perpendicularly to a computer chip 15. The heat pipe 20 is disclosed generally as being a sealed cylindrical tube 22 lined on the inside with a sintered copper wick 30, and that uses circumferentially mounted fins 23 to increase the efficiency of heat transfer away from the computer chip 15. The Examiner admits that Chao does not teach or suggest a grooved sintered wick having at least two lands that are arranged in fluid communication with one another through a particle layer disposed between them where the particle layer comprises at least one dimension that is no more than about six average particle diameters.

In order for a prima facie case of obviousness to be established, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference (or references when combined) *must teach or suggest all the claim limitations.* MPEP §2142 [emphasis added]. Thus the Examiner must be relying upon the Eastman reference to not only provide the missing teachings to Chao, but also the requisite motivation to combine. Neither are provided by the Eastman reference.

Eastman discloses a heat pipe capillary wick constructed from a sintered metal cylinder formed in close contact with the inner diameter of a heat pipe casing, and containing longitudinal grooves on the wick's inner surface, adjacent

to a vapor space. Eastman's grooves provide longitudinal capillary pumping while the capillary pressure of the sintered wick provides liquid to fill the grooves and assure effective circumferential distribution of liquid in the heat pipe. At col. 4, lines 8-23, Eastman teaches an example of his sintered grooved wick as follows:

> ". . . One embodiment of the invention is a heat pipe formed of an oxygen-free copper shell one-half inch in diameter and 24 inches long with a wall 1/32 inch thick. An oxidized stainless steel mandrel 3/8 inch in diameter with 12 grooves 0.05 inch deep and approximately 0.05 inch wide is centered within the outer shell, and the spaces between the mandrel and outer shell are filled with fine copper powder such as AMAX Type B powder. The assembly is then fired in an atmosphere of humidified hydrogen for one hour at 900. degree. centigrade. The mandrel is removed, leaving a grooved wick consisting of copper powder sintered to approximately 48% of the theoretical density. The heat pipe ends are then closed, the working fluid inserted and the heat pipe vacuum processed and sealed by means well known in the art. . . ."

Following Eastman's prescription, a wick layer (34) is formed between lands that is no less than 0.030 inches thick and .050 inches wide. This thickness and width far exceeds the less than about six average particle diameters defined by Applicant's claims. More particularly, Eastman teaches an outer diameter of his heat pipe of .5 inches and a heat pipe wall thickness of 1/32 inch or .032 inches. Therefore the inner diameter of his heat pipe will be equal to .5 inches - (2 x .032 inches) which equals (.5 inches - .064 inches) or .436 inches. Eastman then teaches a mandrel diameter of 3/8 inch or .375 inches. Thus Eastman's wick thickness is equal to one-half of the difference between the heat pipe inner diameter (.436 inches) and his suggested mandrel diameter (.375

inches) or no less than .030 inches which is well outside the range of six average particle diameters. When Eastman is combined with the teachings of Chao, a sintered copper wick layer for a heat pipe is suggested with 12 grooves that are 0.05 inches deep, approximately 0.05 inches wide, and about .030 inches thick – a combination that would not possibly have led one of ordinary skill to a sintered grooved wick having at least two lands arranged in fluid communication with one another through a particle layer disposed between them where the particle layer comprises at least one dimension that is no more than about six average particle diameters.

Since nothing in these prior art references would lead a person of ordinary skill in the art to design an apparatus like that described in the application, or defined by claims 1-3, 5-7 and 9-11, it appears that hindsight knowledge of the present invention is the only motivation to combine these references. In particular, neither of the references relied upon by the Examiner teach or suggest a particle layer disposed between lands of a sintered grooved wick that comprises at least one dimension that is no more than six average particle diameters. In fact, Chao admittedly fails to teach or suggest grooves at all, and Eastman teaches a width and thickness (between the lands that define his grooves) of many times more than six average particle diameters.

Applicants respectfully submit that the motivation to combine references cannot come from the invention itself. See, In re Oetiker, 24 U.S.P.Q. 2d 1443, 1446. An Examiner commits clear error when rejecting a claimed invention as an obvious combination of the teachings of two prior art references when the prior

art provided no teaching, suggestion, or incentive supporting the combination. In re Bond, 910 F. 2d 831, 15 U.S.P.Q. 2d 1566 (Fed. Cir. 1990). Accordingly claims 1-11 are patentable over the proposed combination of Chao with Eastman. Reconsideration and withdrawal of the rejection of claims 1-3, 5-7 and 9-11 under 35 U.S.C. 103(a) are requested.

With regard to Item 2, Applicants have established hereinabove that the proposed combination of Chao and Eastman utterly fails to teach or suggest, in any way, an average particle diameter or a particle layer having less than a specified number of average particle diameters. The Khrustalev reference appears to have been combined with Chao and Eastman by the Examiner to provide missing teachings relative to a sintered grooved wick layer (64) and by alleging six average particle diameters is within a range from about .005 millimeters to about .5 millimeters (citing col. 6, lines 51-54 of the Khrustalev reference in support of this allegation). A review of the Khrustalev reference yields no such disclosures whatsoever.

At col. 6, lines 51-54, Khrustalev discloses:

> ". . . Capillary wick 64 may comprise adjacent layers of screening or a sintered powder structure with interstices between the particles of powder. In one embodiment, wick 64 may comprise sintered copper powder, aluminum-silicon-carbide (AlSiC) or copper-silicon-carbide (CuSiC) having an average thickness of about 0.1 mm to 1.0 mm. . . ."

Khrustalev never once discusses or suggests an average particle diameter or, even more significantly, a number of average particle diameters that

will reside in the layer of sintered material that forms his wick (64). Instead, Khrustalev discloses an average thickness of the entire wick layer as being in a range from about 0.1 mm to 1.0 mm, and not a range from about .005 millimeters to about .5 millimeters as stated by the Examiner. Moreover, Khrustalev never teaches or suggests that his wick layer should be disposed between at least two spaced-apart lands and comprise at least one dimension that is no more than six average particle diameters, i.e., at least one dimension that is within a range from about .05 millimeters to about .25 millimeters. Thus the supposed teachings of Khrustalev relied upon by the Examiner to support the proposed combination do not exist in that reference. Claims 4 and 8 are allowable over the proposed combination of the Chao and Eastman references, with the teachings of Khrustalev. Reconsideration and withdrawal of the rejection of claims 4 and 8 under 35 U.S.C. 103(a) are requested.

With regard to Item 3, Applicants have considered the Hamburgen et al., Tajima, Sarraf, Tanaka et al. (note, Tanaka teaches void diameters *not* particle diameters), Meyer, IV et al., Luo and Moore references identified by the Examiner as pertinent and determined that none of them, whether taken alone or in any valid combination with the Chao, Eastman or Khrustalev references anticipates or renders obvious the present invention.

In view of the foregoing, Applicants respectfully submit that claims 1-11 are in condition for allowance. Favorable reconsideration is therefore respectfully requested. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Appl. No. 10/618,965
Docket No.: H1799-00207
Reply to Office Action dated November 17, 2004

If a telephone conference would be of assistance in advancing prosecution of the above-identified application, Applicant's undersigned Attorney invites the Examiner to telephone him at **717-237-5516**.

Respectfully Submitted,

Date: 2/14/05

Samuel W. Apicelli
Registration No. 36,427
Customer No. 08933
DUANE MORRIS LLP
305 North Front Street, P.O. Box 1003
Harrisburg, PA 17108-1003
(717) 237-5516

HBG\132049.1